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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/988,658	11/20/2001	Akira Oosawa	Q66559	8995

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EXAMINER

LAVIN, CHRISTOPHER L

ART UNIT PAPER NUMBER

2621

DATE MAILED: 07/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/988,658

Applicant(s)

OOSAWA, AKIRA

Examiner

Christopher L. Lavin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1 – 6 and 8 – 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kano (5,359,513) in view of Jatko ("Nonlinear filter derived from topological image features", SPIE Vol. 1295 Real-Time Image Processing II, 1990).

In regards to claim 8, Kano discloses An apparatus for detecting suspected anomalous shadows, comprising: an interimage processing means for obtaining a difference image representing a difference between two images, which have been obtained of a same subject at different photographing times, by subjecting said two images to an interimage process to obtain the difference between said two images (Kano discloses an interimage processing means in the paragraph starting at column 2, line 20. In the paragraph Kano discloses that a "pair of temporally sequential chest

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images" are used to obtain a difference image. One of the two images is aligned to the second image before the difference image is formed.), [an image processing means for obtaining a processed difference image by subjecting said difference image to an image process wherein an actual difference between the two images on which said difference image is based is enhanced relative to artifacts appearing due to misalignment of a position of a structural element of the subject on one of the two images from a corresponding position of the structural element on the other of the two images], and a detecting means for detecting the actual difference between the two images from the processed difference image as suspected anomalous shadows (In the paragraph starting at column 14, line 3 Kano discloses that a CAD system can be used for the detection of abnormal shadows, "Also, existing computer-aided diagnosis schemes for the detection of abnormalities in the chest images".).

As applicant has argued in remarks to the prior office action of this case, Kano does not perform an image processing operation intended to remove artifacts from the difference image. However in the field of image processing it is well known to remove small artifacts resulting from alignment errors as shown by Jatko (abstract and p. 12, final paragraph – p. 14, first paragraph) using morphological filters.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use morphological filtering (as taught by Jatko) on the difference image created by Kano. As Jatko teaches (abstract) image artifacts result when a difference image is formed. Jatko further states (first full paragraph on page 9) that uncorrected these artifacts could be misinterpreted as flaws (in the case of Kano

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abnormal shadows). Therefore filtering to remove the artifacts will result in a more accurate image analysis as a primary source of error will be removed.

In regards to claim 9, An apparatus for detecting suspected anomalous shadows as defined in claim 8, wherein the image processing means is a means for carrying out a process which suppresses the artifacts more than the actual difference between the two images (Jatko: As previously shown the morphological filters are designed to remove the artifacts will leaving the actual difference. Thus the artifacts will be suppressed far more than the actual difference image by the filtering operation.).

In regards to claim 10, An apparatus for detecting suspected anomalous shadows as defined in claim 9, wherein as a means for carrying out the process which suppresses the artifacts more than the actual difference between the two images, the image processing means performs a process based on a morphology process employing structuring elements that are larger than the artifacts while smaller than the actual difference (Jatko: p. 12, final paragraph – p. 14, first paragraph and figure 4: As seen the erosion filter in the first operation will remove artifacts that are smaller than the kernel.).

In regards to claim 11, An apparatus for detecting suspected anomalous shadows as defined in claim 8, wherein the image processing means is a means for carrying out a process which enhances the actual difference between two images relative to the artifacts (By suppressing the artifacts Kano as modified by Jatko is enhancing the actual difference.).

In regards to claim 12, An apparatus for detecting suspected anomalous shadows as defined in any of claims 8, 9, 10, or 11, wherein the interimage process is a subtraction process in which the structural positions of the two images are correlated and a subtraction process is performed therebetween (Kano: col. 2, lines 20 – 28: Image registration is correlation.).

In regards to claim 13, An apparatus for detecting suspected anomalous shadows as defined in any of claims 8, 9, 10, or 11, wherein the two images upon which the interimage image is based are radiation images that have been obtained of the same subject in a temporal series, each of said images having been obtained at a different time, and which become the objects of a comparison to determine temporal change (Kano discloses in the paragraph starting at column 5, line 1 that an "interval change enhancement between a pair of temporally sequential chest images, including the steps of digitization of a pair of chest radiograph images..." is performed.).

In regards to claims 1 – 6, claims 1 – 6 are rejected for the same reasons as claims 8 – 13. The argument analogous to that presented above for claims 8 – 13 is applicable to claims 1 – 6.

4. Claims 7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kano in view of Jatko as applied to claims 1 – 4 and 8 – 11 respectively, and further in view of Doi.

In regards to claim 14, Kano (as modified by Jatko) discloses an apparatus for detecting suspected anomalous shadows and in the paragraph starting at column 14,

line 3 that a CAD system (Doi) could be used to detect anomalous shadows. Kano however does not disclose that the shadows should be substantially round-shaped.

Doi teaches in the paragraph starting at column 8, line 47 that "true nodules generally contained high circularity". Nodules are abnormal shadows. Doi uses the fact that shadows are normally highly circular to detect abnormalities.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use the knowledge taught by Doi that abnormalities are highly circular to detect the abnormal shadows in the apparatus disclosed by Kano. As taught by Doi circularity is a very accurate way of detecting abnormal shadows, using that knowledge makes detecting abnormal shadows much easier.

In regards to claim 7, claim 7 is rejected for the same reasons as claim 14. The argument analogous to that presented above for claim 14 is applicable to claim 7.

Response to Arguments

5. Applicant's arguments, see pages 8 and 9, filed 5/12/05, with respect to the rejection(s) of claim(s) 1 – 14 under 102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of a new search. Please see the rejections for further details.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher L. Lavin whose telephone number is 571-272-7392. The examiner can normally be reached on M - F (8:30 - 5:00).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mancuso Joseph can be reached on (571) 272-7695. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christopher Lavin



BRIAN WERNER
PRIMARY EXAMINER